Course Name Physics II Laboratory

Course Code PH(EE)491

Course Credit 2

Contact Hour 3P

Prerequisite

Course Objective

The course objectives are:

1. Narrate the scientific details of various electronic &optical devices.
2. Explain the electronic transport phenomenon inside metal, insulator, semiconductors and related areas of applications.
3. Develop knowledge of underlying physics behind the magnetic and super conducting materials and their potential use in modern technology.
4. Apply various semiconducting devices for device operations such as sensor, detector, actuators.
5. Apply quantum mechanics and solid state physics to study organic semiconductors & nanomaterials related areas of applications.

Course Outcome

On completion of the course students will be able to

1. Define, understand and explain
   - Instruments used in spectroscopy
   - Oscilloscope (digital)
   - Solenoidal field, Magnetization, demagnetization
2. Apply the knowledge of
   - Hysteresis in magnetic storage
   - Photovoltaic action in solar cell
   - Band theory in operation of LED
3. Analyze
   - Role of magnetic field in changing resistance of a sample
4. Conduct experiments using
   - Intrinsic semiconductor
   - Temperature sensor
   - Photovoltaic cell, Light emitting diodes, Light dependent resistor
   - Various types of magnetic materials
   - Curie temperature of the given ferroelectric material
5. Communicate effectively, write reports and make effective presentation using available technology
   - on presentation of laboratory experiment reports
   - on presentation of innovative experiments
6. Engage in independent self-study to formulate, design, enhance, demonstrate
   - Performing mini project with the lab

CO Mapping with departmental POs

H: High, M: Medium, L: Low

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	√											
CO 2		√										
CO 3			√									
CO 4	√	√	√	√		√			√	√		
CO 5			√							√		
CO6			√	√	√	√			√			√

Course Content:

Experiments on quantum mechanics ii &energy band theory

1. Determination of band gap of a semiconductors/thermistor/four probe method.
2. Determination of hall co-efficient of a semiconductor.
3. Measurement of magnetoresistance of a semiconductor.
4. Determination of velocity of ultrasonic wave using piezoelectric crystal.

Experiments on solid state electronic devices

5. Study of I-V characteristics of a thyristor
6. Study of I-V characteristics of a thermistor.
7. Study of drain characteristics and transfer characteristics of a MOSFET and hence determine the FET parameters (drain resistance, transconductance & amplification factor).
8. Study of I-V characteristics of a varactor diode
9. Study of I-V characteristics of tunnel diode.

Experiments on electric & magnetic properties of materials:

10. Study of hysteresis curve of a ferromagnetic material using CRO.
11. Use of paramagnetic resonance and determination of lande-g factor using esr setup.
12. Measurement of curie temperature of the given sample.
13. Measurement of specific charge of electron using crt.
14. Measurement of losses in a dielectric using LCR ckt.
15. Study of dipolar magnetic field.